CLAIMS

1. Projection objective comprising a combination of lenses comprising a front group (Gr_{front}) of lenses and a rear group (Gr_{rear}) of lenses that are placed on either side of a diaphragm and are intended to transmit a divergent light beam to a flat screen (EC), characterized in that it includes at least one hyperbolically shaped mirror (M1), called a hyperbolic mirror, oriented so as to receive, on its convex face, the light coming from the said front group (Gr_{front}) of lenses and to transmit the said beam to the said screen.

2. Objective according to Claim 1, characterized in that a first focus (F1) of the said hyperbolically shaped mirror is positioned in the region, called the pupil region, defined by the image of the said diaphragm by the said front group of lenses (Gr_{front}).

3. Objective according to either of Claims 1 and 2, characterized in that the said rear group of lenses and/or the said front group of lenses include/includes at least one geometric-distortion correcting optic (L1) that has a conic shape.

4. Objective according to Claim 3, characterized in that the said geometric-distortion correcting optic (L1) is located in the rear group of lenses and has a hyperbolic shape.

5. Objective according to Claim 4, characterized in that the said geometric-distortion correcting optic is located in that part of the said rear group of lenses furthest away from the said diaphragm.

6. Objective according to any one of Claims 1 to 5, characterized in that it includes at least one meniscus (L5) located in that part of the said front group or of the said rear group that is closest to the said diaphragm, the said meniscus or meniscuses being designed

to correct the astigmatism defects induced by the said hyperbolic mirror (M1).

7. Objective according to any one of Claims 1 to 6, characterized in that it uses a peripheral field of the object plane and in that the said hyperbolic mirror (M1) is located entirely on one side of a plane passing through the axis of symmetry of the hyperbola so as to fold the beam without the objective casting a shadow on the image.

8. Objective according to any one of Claims 1 to 7, characterized in that it includes a first return mirror (M4) that is placed near the front group (Gr_{front}) of lenses in a first direction that corresponds to the direction of the beam transmitted by the lens, and reflects the said beam in a second direction, the said hyperbolically shaped mirror (M1) being located along the second direction and being oriented in order to receive the beam reflected by the said first return mirror (M4).

9. Objective according to Claim 8, characterized in that the second direction makes an angle of less than 60° with the said first direction.

10. Objective according to any one of the preceding claims, characterized in that it includes two meniscuses (ME1, ME2) located on either side of the said diaphragm, the concave parts of which are oriented towards the said diaphragm.

11. Objective according to any one of Claims 1 to 10, characterized in that the said diaphragm lies in the focal plane of the rear group of lenses.

12. Objective according to Claim 11, characterized in that it includes a positive lens (L7) located between one of the said meniscuses (L5) belonging to the said front group of lenses (Gr_{front}) and the said hyperbolic mirror (M1).

13. Projection or backprojection apparatus applying the objective according to one of Claims 1 to 12, characterized in that it includes a display located on one side of the optical axis of this rear group of lenses and making it possible to transmit a modulated light beam to a region of the rear group of lenses that is located on one side of the axis (XX') of the said rear group of lenses.

14. Backprojection apparatus according to Claim 13, characterized in that it includes at least one second return mirror (M3) that receives the light reflected by the said hyperbolic mirror (M1) and reflects it onto the rear face of the screen of the said back projection apparatus.

15. Backprojection apparatus according to Claim 14, characterized in that the said second return mirror (M3) makes a zero angle with the plane of the said screen (EC).

16. Backprojection apparatus according to either of Claims 14 and 15, characterized in that the said second return mirror (M3) lies in the same plane as a third return mirror (M4) placed near the front group (Gr_{front}) of lenses along a first direction corresponding to the direction of the beam transmitted by the lens and reflecting the said beam in a second direction, the hyperbolically shaped mirror (M1) being located along the second direction and being oriented in order to receive the beam reflected by the said third return mirror (M4).